

## Reporters See Indifference On Genetically Modified Food

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### **Abstract:**

Interviews with journalists indicate decreasing public opposition to genetically modified food and the perception that U.S. consumers do not understand these products. Journalists continue to be skeptical about sources and experts on GM food.

### **Article:**

As much as they may distrust news media, non-scientist audiences for science news depend on journalists to obtain information from reliable sources, to interpret it and to make it accessible. This is especially true with respect to emerging issues in science and technology. While science may generally enjoy an upper hand over journalism, science's interpretive control is significantly loosened in cases of controversial topics.<sup>1</sup> The already difficult relationship of scientists and journalists is more fluid, fraught and significant with science stories that involve questions of public impact and policy, which in turn often involve government regulation, new technologies and corporate development and support.<sup>2</sup> One such issue is genetically modified food, involving as it does human consumption of plants altered through genetic manipulation and of food products made with genetically modified (GM) ingredients.<sup>3</sup> In the decade since the U.S. government first approved genetically engineered crops, literally millions of acres of GM crops have been planted. Approximately 80 percent of the processed foods sold in supermarkets use some GM product. In 2006, 89 percent of all soybeans, 61 percent of corn and 81 percent of cotton planted in the U.S. were genetically engineered. For example, oils from these crops are genetically modified.<sup>4</sup>

The question of GM food and other food risks (put positively, food safety) is itself fraught with questions. First, scientists are divided regarding its potential dangers, if not to individual consumers, then to the environment or agriculture. Meanwhile, in the U.S. and abroad, relationships among scientists, activist organizations, corporations, government agencies, individual farmers and agribusinesses and other stakeholders are complex and sometimes competitive or even antagonistic.<sup>5</sup> As with other science issues, the huge volume of efforts from universities, corporations, think tanks, advocacy groups and government agencies to garner attention requires journalists covering issues involving GM products to act as gatekeepers.<sup>6</sup>

Given reporters' significance here as gatekeepers, the focus is what reporters say they think and know about genetically modified food, also known as genetically engineered, bioengineered or transgenic food. Of particular concern is whom journalists regard as credible, or not, and why. News regarding GM issues is usually studied in terms of content (or quantity); this was not the primary method here, although articles by reporters interviewed were carefully read and compared to a sample from reporters not interviewed.

### ***The Scientist-Journalist Relationship***

Science journalists have been criticized on several grounds, including for maintaining a "gee whiz" attitude toward science and forgetting their usual skepticism, highlighting the positive "mystique" of science and avoiding controversial issues and presenting each medical and nutrition report as if it were the whole truth, producing a "cure-of-the-day" mentality.<sup>7</sup> Given Americans' general respect for science and given reporters' lack of confidence in their understanding of science, scientists can purvey story ideas to journalists and drive the

interpretive framework; markers of scientists' power include journalists' acceptance of embargoes on science journal articles. Notably, editors seem only slightly more concerned about food safety than do Congressional policymakers and scientists.<sup>8</sup> Citizens may feel disenfranchised from policy-making processes, but opinion polls suggest that public support for science continues and that such enthusiasm is based on positive news coverage.<sup>9</sup> Although government agencies may not consistently or even generally enjoy public trust, a 2003 Pew survey found that a clear majority of Americans trust the Food and Drug Administration and its processes.<sup>10</sup> This is different from the UK, where tabloids and several prestigious broadsheet papers have campaigned against GM food, perhaps because of inter-press competition, and where controversies, including over GM food, have eroded, but certainly not destroyed, trust in institutions handling science and technology."

All reporters compete with other reporters for space, with other media and other activities for audiences' attention and with one another for sources' time. But science reporters face particular difficulties in mastering their beat; increasingly, specialization of science compounds journalists' difficulties.<sup>12</sup> Moreover, by deadline they must decide how detailed and technical their stories can or must be and how much "translation" is necessary for audiences lacking both scientific literacy and patience for sorting out conflicting and complicated claims. Meanwhile, scientists have been sensitized to the need for visibility. In part the willingness of scientists and public relations officers for laboratories and universities to speak directly or indirectly to journalists reflects the increasing business orientation of research.<sup>13</sup> While some critics decry scientists' participation in the "dumbing down" of science to make it more palatable, scientists recognize that "scientific literacy" is the basis of public support.<sup>14</sup> Again, in cases of "risky" science, journalists' freedom to select whose voices will appear is suddenly encouraged and sanctioned, even by scientists themselves.<sup>15</sup>

### *Media Coverage of Biotechnology*

U.S. newspaper coverage of GM foods has peaks and valleys but is not extensive.<sup>16</sup> No wonder that 43 percent of respondents to a recent national survey said they had heard little or nothing about GM food, although 69 percent said they read a newspaper more than once per week.<sup>17</sup> A Pew survey found that in 2001, following the "StarLink" controversy, 44 percent said they had heard a "great deal" or "some" about GM foods; only 34 percent said this in 2003.<sup>18</sup> Evidence that Americans do not understand GM foods, however, does not mean that news coverage has no impact. Even after worries over a food scare abate and attention switches to a new topic, low-level anxiety may persist, and coverage of audience responses to scares may increase that anxiety.<sup>19</sup> Journalists rely heavily on official sources, such as government officials, scientists and industry leaders. Across diverse topics and especially with controversial issues, the need to project neutrality tempts journalists to privilege accredited representatives of major institutions; these sources, therefore, enjoy greater access to journalists and greater power to define key issues. Science/ technology/business stories tend to be dominated by government sources, with industry a close second.<sup>20</sup> On controversial issues, science writers threw out 85 percent of the press releases they received, but kept 85 percent of the ones that seemed to come from scientists.<sup>21</sup> Science reporters do not always feel they must balance perspectives; they may use sources to help structure a story, or provide a skeptical tone.<sup>22</sup>

Studies of environmental pressure groups show that advocacy groups that enjoy financial, organizational and knowledge resources gain access and thus greater legitimacy.<sup>23</sup> Recent analysis of four newspapers' coverage of pesticide use found that anti-pesticide quotations from activist and "counter-hegemonic" sources were the most often quoted.<sup>24</sup> Nonetheless, industry sources may dominate GM food and biotechnology stories. According to 1994 data, industry was the main source at 47.2 percent, academia provided 25.7 percent and the government provided 8.5 percent, just ahead of anti-biotechnology activists.<sup>25</sup>

### *Business and Technology Writing*

Business journalism is relevant since biotechnology is an issue where the agendas of scientists, industry and policy-makers or government agencies converge. Analysis of 20 years of coverage found that only 4 percent of the GM articles appeared in science sections, 26 percent appeared as news stories, 24 percent were in the business section, 28 percent were opinion pieces and 5 percent appeared on food or lifestyle pages.<sup>26</sup>

As in science, business journalists face challenges in dealing with new specializations and problems in a beat already highly complex and technical. As with other journalism forms, business reporters are accused of exaggerating corporate fraud and greed and of unfairly catering to advertisers and public relations personnel by regurgitating press releases.<sup>27</sup> One financial reporter describes business writers as chronically "behind the curve" with respect to substantive and ethical issues:

The tradition of speaking truth to power is far less understood and far more difficult among business journalists, who collect quotes without considering sources' underlying agendas.<sup>28</sup>

Nearly all newspaper executives and business leaders and 72 percent of journalists and academics say journalists do not understand complicated economics and business issues.<sup>29</sup> Finally, not unlike science journalists, business reporters write for lay investors. But they also serve a business community unlikely to desire aggressive reporting.

### *Research Questions*

RQ1:

What is reporters' assessment of the quality and quantity of reporting about GM food and of the likely sources of information about GM food?

RQ2:

What is reporters' assessment of the readers' interest in and knowledge of GM food?

RQ3:

What positions do reporters take, if any, on the safety or risks of GM food?

### *Method*

The participants for this study were identified by using Lexis / Nexis, Dialog Information Services and Factiva to search 19 major U.S. newspapers between January 1999 and October 2003. Keyword phrases included genetically modified food, genetically engineered crops and bioengineered food. Five newspapers were eliminated because no reporter seemed to have covered the issue more than twice, leaving 14 newspapers and one wire service in the sample. Additional possible participants were sought from regional newspapers originating stories through early 2004. No contact information could be found for some reporters who had left those newspapers. The 66 others were e-mailed with a request for a half-hour-long telephone interview, with an explanation of the funding for the research and the IRB form attached in 2003 and 2004, a period when no particular GM scares arose.<sup>30</sup> Those who did not respond were contacted several more times by e-mail and telephone. Subsequent requests mentioned the possibility of responding by e-mail; 32 reporters reached by e-mail and telephone never responded.

Twelve reporters refused to be interviewed on the grounds that they do not cover GM foods or hardly do so. All five wire reporters who were reached said they were "not comfortable" responding to questions and/or needed editor approval. Asked to provide such permission, the wire service's relevant editor replied that reporters "would not be able to answer" the questions and suggested contacting corporate communications. This editor did not respond to e-mails requesting clarification. Corporate communications said that journalists need editor approval.<sup>31</sup> Thus, 16 interviews were completed, each lasting 45 to 60 minutes. These include reporters at USA Today, The Christian Science Monitor The New York Times, Washington Post, and major papers in Boston, Atlanta, San Francisco, St. Louis and Chicago.<sup>32</sup> Geography made no difference; below, references to location are not intended to imply a pattern, unless this is stated explicitly. The articles themselves were read closely to help formulate questions, to enable checking reporters' answers against the stories and to compare stories of reporters who cooperated with articles (two each) by 16 reporters who did not, for a total of 62 articles.

The largest portion of the reporters interviewed covered technology, biotechnology or food safety beats. Several have general business assignments, with one of them covering federal regulation, especially of drugs. One

covers agriculture, and two cover food / nutrition / obesity. None had formal training in science. One did a Knight fellowship in biology; a few took graduate-level science writing courses. Most respondents had covered hearings, trade meetings or events, but half had never attended a seminar or meeting for background or informational purposes because these are generally too far away, they reported.

## *Results*

### **Choice Of Terms**

Presumably choice of terms-genetically modified, bioengineered, genetically engineered or transgenic-influences how audiences respond to stories about these foods and food products. Certainly the industry and the U. S. Food and Drug Administration believe terminology makes a difference. The FDA asked manufacturers to avoid "genetically modified" or "GMO" and instead use "bioengineered."<sup>33</sup> All reporters had self-consciously considered word choice, although several never discussed this with editors. Others had often discussed it in searching for a common lexicon across reporters and beats. A couple said they prefer "genetic engineering" since modification occurs naturally and does not describe scientific intervention. Several reporters said they preferred "GMO," which they regarded as "neutral;" but these reporters added that the abbreviation was unfamiliar while "genetically modified organism" was too long. Others said that GMO gets more "negative" reaction.

The majority said they prefer "genetically modified" but also use bioengineered food, biotechnology. They agreed that using several terms is advantageous. All of them said they would never use "Frankenfood," as unnecessarily loaded, unless they were quoting a named source. Table 1 confirms that both reporters interviewed and those not interviewed used a similar variety of terms. On average, per article, those interviewed used 3.6 different terms; those not interviewed used 4.5 terms.

### **Articulation of Major Issues and Assessment of Coverage**

Reporters' lists of the outstanding issues regarding GM foods-and the important issues for reporters to investigate-largely reflected the kinds of beats they covered. Business and technology reporters mentioned technology, trade and economic issues, including whether U.S. consumers and/or consumers and governments abroad will accept it. Several reporters mentioned labeling as a potentially newsworthy controversy.

Nonetheless, an agriculture writer was among several to mention scientific debate about GM foods and potential dangers of genetic modification, including cross contamination. Several reporters mentioned the importance of debunking myths about genetic modification. Several mentioned the importance of providing general education about scientific issues, including specific analyses of risks and benefits.

The reporters contacted for this study acknowledged problems in news coverage of bioengineered food. The most frequently expressed criticisms were that reporters had relied too much on old information, "pulled back on the throttle" on political and/or ethical issues and had been "flatfooted" or insufficiently aggressive. But one insisted, "We're not shying away from anything."<sup>34</sup> In their collective defense, they said the story is not easy to cover and that not enough reporters understand the issues and have the time to work on them. Their willingness to be self-critical is consistent with a UK study. Nearly half the UK journalists said coverage of genetic modification is overly dramatic and alarmist, while the rest said GM reporting was well informed, balancing accounts of risks and benefits.<sup>35</sup>

One reporter said, "My stories are fair, accurate-but I don't see enough coverage."<sup>36</sup> Some apparently agreed. Yet, only one saw the small amount of coverage as alarming, given other important issues and given what readers need to know. All 16 agreed that commercial broadcast journalists have not and cannot cover this topic well, even in long-form stories. A couple applauded coverage by public radio or non-commercial television.

### **Speculation about Consumer Interest and Concern**

Reporters' assessment of U.S. consumers' knowledge of bioengineered food largely echoed reports that U.S. consumers do not understand genetic modification of food, do not know that it is already in the stores and do

not realize they have purchased and eaten it.<sup>37</sup> They had seen and largely agreed with the data showing that people are still surprised to learn that they are eating bioengineered foods, although West Coast reporters said some are well-versed and awareness is growing. Midwestern reporters contrasted urban readers, who either do not care at all and do not pay attention or are very well-informed, to rural readers, who have basic information but remain misinformed.

The question generating the greatest diversity of views dealt with consumers' interest in and attitudes about GM food. Consumers are divided about whether they support these products.<sup>38</sup> According to reporters, across the country people care more about calories and fat content than they care about genetic modification. Several guessed that the average person prefers organic but doesn't understand differences between organic and non-GM. That said, several said that consumer acceptance depends on the product; new products may yet generate concern, they speculated. West Coast reporters were the most likely to characterize most of their readers as skeptical and anti-GM. Most of them speculated that people would think differently if GM foods proved to be dangerous or if a scare erupted. Nutri-pharmaceuticals in particular were seen as having potential for causing outrage. As one said, "There is general willingness to accept-but it's a 'thin acceptance' that could turn, if a crisis emerges."<sup>39</sup>

Data from 2003 found that anti-GM forces in the UK not only rejected proGM arguments but also linked U.S. and British GM policy to the invasion of Iraq.<sup>40</sup> But most reporters balked at the suggestion that Europeans' strenuous rejection of GM crops/seeds reflects anti-Americanism or anti-U.S. corporation sentiment. Certainly they agreed that European governments are more negative, European news coverage is shrill to the point of fear-mongering and European consumers care much more than do Americans. Several noted that European activists oppose multinational/corporate control/U.S. control of agriculture. But others connected Europeans' objections to cultural traditions. According to reporters, Europeans distrust regulatory agencies and want to protect particularistic ways in food and business as part of national and local culture. "We are less romantic," one said. "U.S. consumers are more bottom line driven," was the way another put it.<sup>41</sup> A few speculated that the U.S. is more accepting since it has not experienced mad cow or similar scares; Europeans have more reasons to be nervous.

### **Evaluation of Sources and Resources**

Journalists' assessment of the knowledge and expertise/credibility of their sources, a central concern for this project, produced a wide range of answers. All reporters described themselves as needing to be extremely careful about the sources they consult for stories about food policy or GM food. As with all sources, they said, they needed to do their "homework" to find out sources' probable agendas, given the political, economic and cultural stakes and given the potential emotion the story generates. The analysis of which kinds of sources were quoted shows that no single type significantly dominated the coverage, although industry sources slightly dominated, especially among reporters not interviewed. All claimed to consult a wide variety of sources, both corporate and activist, well beyond what they used in stories. On average, reporters interviewed used 3.4 sources per article, and those not interviewed used 3.5 sources. Those interviewed agreed that few sources represent a "middle ground" or neutral position. Reporters characterized some organizations as "reactionary" or "knee-jerk." One reporter mentioned "extraordinary problems" regarding the credibility of several individuals and groups she had assumed she would trust and use but couldn't. Only a couple, however, described themselves as consistently discounting, much less ignoring, a particular source or kind of source, such as industry lobbyists or activist organizations.

Some reporters could produce a long list of useful sources. Others could recall few. The Pew Initiative on Food Biotechnology, established in 2001, was frequently mentioned as reliable, as was The Center for Science in the Public Interest. Reporters often consult government agencies and regulators, but the Federal Food and Drug Administration and the U.S. Agriculture Department officials were called "second tier sources," "close-mouthed" and "often unwilling to talk beyond the Official' agency position." State-level officials had somewhat better reputations.



Most reporters described fruitfully and frequently consulting experts and / or researchers at universities, usually in-state but also out-of-state land grant institutions. Cooperative extension agents were assumed to favor GM. On the other hand, four reporters characterized university scientists, among other potential sources, as also either opposed to GM or working with industry; one described them as "quite gung-ho." One reporter calmly conceded that universities must work with corporations, so are not disinterested. Another, however, expressed outrage that university scientists take money from industry. Such outrage did not stop reporters from quoting university and corporate researchers.

Reporters noted that they cannot avoid advocacy groups as "actors." Their representatives must be asked why they take particular positions. That said, one reporter said, "I do not rely upon advocacy groups for information-either pro or con .... I do not view the 'research' and other papers they supply as credible and / or reliable." Among their criticisms of activists groups such as Greenpeace and Food First was that they "play fast and loose with truth," "shade truth for greater good" or pass on information with "blatant inaccuracy." One said, "But I also tend to discredit the radical NO GMO groups because they either take extreme positions and/or pass on research that is later discredited."<sup>42</sup>

### **Reporters' Position on GM Food**

All but one journalist answered questions about whether they personally regarded GM food as safe. Perhaps this explains why, exactly twice as many articles by reporters interviewed and those not interviewed focused on regulatory questions, rather than having safety and consumer issues as their primary theme. Nearly all of them emphasized that GM foods should be understood in the context of relative risks and benefits. For example, pesticides and herbicides pose more serious problems. Three, including two food / nutrition writers, mentioned a preference for organic, natural and unprocessed foods. Nonetheless, most said they did not go out of their way to avoid buying or eating GM foods. Several either mentioned the impossibility of proving a negative or said they had never been particularly worried. Slightly more accepting than were editors surveyed in 1993, others described themselves as "decreasingly afraid," "less wary of it than I was," or "not getting more worried."<sup>43</sup>

Notably, no one enthusiastically endorsed GM foods. At least some GM experiments did not sound like "good ideas" to them and "who knows what new issues will develop." An agriculture writer expressed concern about terminator seeds and other products that might contaminate non-GM crops. Nutrition and food writers were the most likely to describe themselves as distrusting large corporations, although they noted GM's potential for addressing global poverty and hunger.

### **Conclusion**

These journalists vigorously proclaimed their independence and status as the ultimate arbiters of story content, as well as their skepticism regarding various sources, including in science and industry. These journalists' acceptance of GM seems less a matter of celebrating science and more a matter of pragmatically assessing relative risks and relative truths. Establishing how much coverage is enough or sufficient is difficult, especially since space is limited, and "enough" needs to be compared to other stories on comparable topics in the same or other areas. But if they are covering the story less often than they want, it is not because of editors' biases or political position on GM food. Nor is it pandering to industry or government sources. Rather, they said, it represents editors' conjecture-which the reporters themselves largely confirm-that the public is not highly interested. Alternatively, they cover a complicated specialization and so have other equally or more important issues to address. None described a GM story being spiked.

According to Pew's 2003 report, 83 percent of Americans trust what the FDA says about GM foods (37 percent "a great deal"), and 81 percent say they trust scientists/academics, farmers, family and friends. But Americans do not understand what the FDA is saying or doing with GM foods. Most of them are unlikely to talk to academics or scientists, who in any case do not speak with a single or clear voice. Most consumers are even less likely to find farmers with whom to discuss this, literally or virtually. And finally while, they can discuss GM foods with family and friends, they do not. Almost two-thirds of Americans have never discussed biotechnology with anyone. Of the rest, few discussed GM more than "occasionally."<sup>44</sup> Even if they do, they are discussing it

with family and friends who probably are equally confused. Meanwhile, Web sites may not provide credible information about GM foods. The Internet enables wide dissemination of both corporate messages and activist critiques.<sup>45</sup> But, of 100 GM-related websites, only one-third of the sites were "above mediocre" in quality.<sup>46</sup> Moreover, the Internet is primarily used for following up on issues; it does not stimulate awareness.<sup>47</sup> If people don't know that GM foods are an issue, as polls indicate, they are unlikely to undertake Internet research.

Reporters apparently share consumers' skepticism about the truthfulness of corporations invested in GM food, especially Monsanto, although one Midwestern reporter said that while reporters should not "totally" trust Monsanto, its credibility gap had narrowed with new management.<sup>48</sup> Not surprisingly, otherwise, reporters and consumers have very different views of who is trustworthy. Reporters are also skeptical of government agencies and regulators. They worry that not only corporation-based scientists, but even university scientists may be biased, given their funding sources. Reporters offered fairly casual accounts of their suspicions, except for activists, for whom they reserved their most critical opprobrium.

Only 41 percent of Americans say they trust the news media regarding GM foods; news media are even less trusted regarding GM foods than are consumer groups (68 percent), government regulators (63 percent), food manufacturers (54 percent) and religious leaders (50 percent).<sup>49</sup> But while Pew's 2003 data offer evidence of an angry spill-over of suspicions about the "media" and the news media, consumers have few choices for information, much less credible information, about GM foods.<sup>50</sup> Solid, consistent reporting on GM foods is necessary for decision-making by consumers, a group here referring not only to "ordinary" people who buy and eat food, but also farmers, food producers, scientists and policy-makers who consume news when trying to understand critical responses. Reporters are necessarily mediators.

This research suggests that journalists who have covered the GM food story as a whole have assessed newspaper readers' knowledge fairly well. They understand that their readers do not know how genetic modification works. Surveys suggest that Americans will express opinions about GM foods. But reporters are correct in suggesting that these opinions are formed on the basis of little information, are plastic and are shifting. Moreover, although they may try to answer questions about GM foods, they largely answer them incorrectly. Some 77 percent of Americans told Pew they know "very little" or "nothing at all" about genetic engineering, and only 2 percent said they know "a great deal."<sup>51</sup> Especially with the Internet over-promised as an information marketplace, if people need more information about GM food, then newspapers are the place to get it.

### *Notes*

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19. Beardsworth and Keil, Sociology, 164.
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30. This research was supported by a grant to the Rutgers Food Policy Institute by the U.S. Department of Agriculture (USDA), under the Initiative for the Future of Agricultural Food Systems (IFAFS) grant #2002-52100-11203 'Evaluating Consumer Acceptance of Food Biotechnology in the United States,' Dr. William K. Hallman, Principal Investigator. (Views expressed here do not reflect official positions of the USDA, the Food Policy Institute, or Rutgers University, but authors thank the Food Policy Institute and Mary Nucci for assistance, and Helen Steiner for transcribing interviews.) The Rutgers University Food Policy Institute has undertaken several mammoth, national surveys of consumer attitudes and knowledge of GM food; its reports are available on a website and are distributed on diskette, and have been publicized through news releases, and press conferences. Several reporters had received or heard of such reports. A standard IRB form was required, although this may indeed have inhibited responses.

31. Notably, referring to GM food issues, one research team rightly commented: "Lack of cooperation by journalists reflected perhaps both professional pressures, and a preference to interview rather than be interviewed." Guy Cook, Peter T. Robbins, and Elisa Fieri, "Words of Mass Destruction": British Newspaper Coverage of the Genetically Modified Food Debate, Expert and Non-Expert Reactions," *Public Understanding of Science* 15 (2006): 5-29.

32. Although some "smaller" papers, especially in the farm belt, have their own reporters covering GM, many newspapers run Associated Press stories. Since AP stories run in many papers, the failure to win cooperation of any AP reporters is a significant drawback here. Of the 845 articles by reporters unwilling or unable to be interviewed, AP reporters wrote 721. The reporters interviewed wrote a total of 213 articles. Given the importance of the Wall Street Journal, failure to win cooperation from its GM writers is also frustrating. Vestal's 23% response rate to a mailed questionnaire, after six attempts, indicates the difficulty of recruiting journalists for research. Tom Vestal, "Effects of "Biotech Foods: The First Harvest" on Knowledge, Attitudes, and Perceptions of Journalists for Newspapers in Metropolitan Markets in the United States Regarding Food Biotechnology" (MS thesis, Texas A&M University, 1998).

33. Raymond Formanek, Jr. "Proposed New Rules Issued For Bioengineered Foods," *FDA Consumer* 35 (March-April 2001): 9. A study of consumer responses to different terms found that two-thirds had a negative response to "genetic modification"; "biotechnology" produced the most positive images. William K. Hallman, W. Carl Hebden, Helen Aquino, Cara Cuite, John T. Lang, *Public Perceptions of Genetically Modified Foods: A National Study of American Knowledge and Opinion* (New Brunswick, NJ: Rutgers University, Food Policy Institute, 2003).

34. Anonymous journalist response to interview by first author, 2004.

35. This study found that only ten percent of scientists said GM reporting was balanced and represented scientists' views. Barrie Gunter, Julian Kinderlerer, and Dereck Beyleveld, "The Media and Public Understanding of Biotechnology," *Science Communication* 20 (1999): 373-394.

36. Anonymous journalist response to interview by first author, 2004.

37. Hallman, et al. *Public Perceptions*, 2002.

38. Pew, "Awareness," suggests a positive trend but Hallman et al *Public*, 2003, suggest decreasing acceptance.

39. Anonymous journalist response to interview by first author, 2004.

40. Cook, et al., "Words of Mass."

41. Anonymous journalist response to interview by first author, 2004.

42. Anonymous journalist responses to interview by first author, 2004.

43. Maney and Plutzer, "Scientific Information."

44. Pew, "Awareness"; Hallman, et al. *Public Perceptions*, 2003,6.

45. Susannah Hornig Priest, *A Grain of Truth: The Media, the Public, and Biotechnology* (Lanham, MD: Rowman & Littlefield, 2001).

46. Claire R. McInerney and Nora J. Bird, "Assessing Website Quality in Context: Retrieving Information About Genetically Modified Food on the Web," *Information Research* 10 no. 2 (2005): paper 213.

47. National Science Board, *Science and Engineering Indicators - 2004* 2004 <<http://www.nsf.gov/sbe/srs/seind04/start.htm>> (23 March 2007).

48. Geographic region did not itself make a difference. Reporters in farm states were explicit about their location in those states and implied that their answers reflected geography, but their answers were not

significantly different. This is partly consistent with a finding that newspapers use "the rule of least effort" in deciding what sources to use; on the other hand, Griffin and Dunwoody found that news judgment was somewhat sensitive to the local community's economic base, in their case, manufacturing. Robert J. Griffin and Sharon Dunwoody. "Impacts of Information Subsidies and Community Structure on Local Press Coverage of Environmental Contamination," *Journalism & Mass Communication Quarterly* 72 (Summer 1995): 271-284.

49. Pew, 2004.

50. Kimberly Brooks, Pew's director of communication, acknowledged that while the Pew biotechnology website was set up to serve consumers as well as journalists and experts, US consumers rarely access it (unlike people from other continents) (personal communication, September 27, 2004).

51. Hallman et al., *Public Perceptions*, 2003, 7.